I

LEFT with you the question, Why is belief in determinism depressing? The answer which many are disposed to give is that it is not! The physiologist or psychologist or sociologist who is getting on with his efforts to find causal connections in human behavior is not alone not depressed; he has the excitement and pleasure which attend all scientific advance. It is only the realization of what a completed determinism means that is depressing—not to the observer, but to the observed, the human being as a person acting in his own right.

The primary reason for his trouble is his discovery that, if he is all-caused, he, in common with other men, never really does anything. Everything is done ultimately by the physical universe, (which has the disadvantage of not knowing what it does). We may be said to do things precisely as any machine does things. We are transformers of energy, and things happen differently than they would if we were not in the world. Things happen differently because locomotives are in the world, and surely the locomotive pulls the train. But we make the locomotives, so it is we who pull the train; and Nature makes us, so it is Nature which makes the locomotives and pulls the train. Indirectly Nature does all that is done in this universe: it is all the necessary consequence of the most ancient constellations of fact operating under the laws of fact. Hence we are under an illusion—or let us say a half-illusion: we think we do things,
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and so we do, because the ancient stream of energy flows through our switch-box; but we also fancy that we do things as originators, thinking our own thoughts, using an initiative which is our own and no other's—and there on this theory we are wrong, for Nature produces the thoughts also.

Looking at the process of history as a whole, we have to take the sum of all such private reflections and say that the history of tomorrow is already written. We are not admitted to the secret, but what we shall do is settled in the shaping of all earlier facts. Our several careers are already marked out and in principle knowable. The outcome of the war is determined, and of all that will come after the war. We shall continue to plan, strive, and suffer, for these efforts are part of the picture of what shall come. It is perhaps this that most appalls us, that we cannot in any way change the amount of caring and striving we are predestined to perform, since our loving and hating, fearing and fighting, are already printed on the everlasting film which inexorably unrolls itself, not knowing what it does.

There are those who would draw the sting of this puppet-picture of human life by saying that, if all things are determined, nothing is changed. All inner relations remain as they are (just as they do when we accept the assumption that we see everything upside down): our feelings of interest, effort, triumph, yes, the sense of free-origination itself, all fall into their natural sequence and make precisely the same sense that they now seem to make. It is doubtless this that Spinoza had in mind when he wrote about the causes which bring about our volitions:

There is not in the mind a will absolute and free; but the mind is so conditioned as to be caused to will this or that, by some cause which is determined by another cause, and this by another and so to infinity.¹...¹

Men think themselves free, because they are conscious of their volitions and of their desires and are oblivious of the causes which dispose them to desire and to will.¹

And it may be the sense of the remark which Sir Charles Sherrington appends to this, his quotation from Spinoza:

... from the human standpoint, the important thing is less that man’s will should be free than that man should think that it is free. That can indeed serve to activate and sustain his zest-for-life.²

This comment, however, is an admission that the belief in freedom is necessary to activate and sustain the zest-for-life; and while it is quite in order before one has seen the hoax, it is hard to maintain it afterward, or to see how it can reasonably be maintained.

The deepest impulse in man is the will to be effective, to amount to something, to be a cause. Under the view of determinism this effectiveness remains, not as mine but as of something which passes across my being. We are asked to be satisfied with this passage. The fact that our power is loaned, and that its deeds are mapped out for it, does not cancel the fact that it is power, nor that it is a cause. Every cause is an effect, but none the less has its day as a cause. The energies of the world are older than the sun and have run through all time, but now they run through us, and we are the makers of the next stage of the world’s life. This is not alone plausible; it is quite true. But it fails to reach the heart of the trouble. The power that concerns me is not the power to lift a weight, nor to change my neighbor’s vote, but the power to decide, to invent something new, to devise a possibility which apart from my thought the universe did not contain, and to bring that possibility into existence.

It is because determinism eliminates this particular, specific, and essentially human form of power that it is a subtly

¹Ibid., Prop. 48, appendix.
²Loc. cit., p. 199.
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depressing doctrine. Everyone who first grasps its implication feels as if cold steel had passed through him, even when he fails to understand the source of this touch of death. Is science, then, irrevocably committed to determinism?

I. THE POSTULATES OF BIOLOGY

Biology itself is caught between two postulates which lead to opposite answers in regard to the rôle of the mind. One is that no organ is evolved which does not have some biological utility; the other, that the whole chain of physical phenomena has other physical phenomena as antecedents and nothing but physical phenomena. The former postulate would imply that, since the mind has evidently evolved in the animal series, it has some biological utility. The latter postulate would imply that since behavior is physical its antecedents must be all physical and not mental. The physiologist has never to look for a mental link in the series of events between stimulus and response; whence, the mental phenomena have no utility at all—they merely accompany the brain-and-nerve phenomena which do the work. Biologists like other people fall into the verbal expressions which imply that human and animal wills affect events. They speak of impulses, desires, satisfactions, habits, but they are aware of the peril in this concession to usage and have even devised mind-proof terminologies, as did Beer, Bethe, and Uexkuell, in which no psychological suggestion should be found. In the struggle between these opposing postulates the mechanical ideal tends to win out; but there remains an uneasiness over the question, Why—if the mind has no difference to make in the behavior of organisms—did it ever make its appearance and then develop its insecure cranny to such marvelous dimensions?

Herbert Spencer's psychology appears to reconcile these
two postulates. He rejects any freedom of the will which would make a difference in the causal march of events through the organic body. At the same time, we have an experience of being free which is not illusory. For our wishes and desires are, so far as our experience goes, the instruments by which Nature wins her way with us. His statement has a remarkable conciseness and clarity; in substance it is this:

If you mean by freedom doing as we please then we are all free. For we always do as we please. The point is, that we cannot do anything else. And we cannot please as we please.¹

By determining what pleases us, Nature determines what we do. The course of our mental life is then wholly compatible with a perfect causal mesh in the field of the physiology of the nervous system.

Now James was never as beautifully clear as this, nor as consistent. For laboratory purposes he was willing to insist as firmly as H. S. Jennings on experimental determinism. But when he tries to answer the question, How do we know when an organism is conscious? he assumes that the mind makes a difference. A creature is conscious, he says, if its behavior shows "a pursuit of ends, with a choice of means." We see a horse reaching for a bunch of hay on the floor just beyond the reach of his nose: he is pursuing an end! If he fails to get it by one posture, he tries another, perhaps paws at it with his foreleg, perhaps whinnies a little as if to get a man to work on the problem: he chooses means. Ergo, we say, the horse is conscious—has a mind! All this is non-

¹This passage, from Principles of Psychology, Vol. II, is presumably later than the sixth edition of First Principles, in which he changed his statement of the relation of mind and body. In the first edition he treated the mind as a form of energy, and regarded it as on the level with heat, light, etc. (see his chapter on "The Correlation and Transformation of Forces"). But he later saw the impossibility of measuring consciousness in C.G.S. units, and so attempted a view in later editions which approached the "two-aspect theory," though it never reached a form satisfactory to himself.
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sense from the point of view of the laboratory. No one can identify an "end" in strictly scientific description; and hence not a means. James's language is highly objectionable; but it is there. Further, he believes there is such a thing as "will," and as a psychologist he is obliged to say what it is.

Savagely condensed, James's answer amounts to this: Whatever the organism has done by way of random or reflex movements, we can recall the motor-experience of. And whatever motor-experience we think of intently, we tend to carry out. If you think of yourself grinning, you grin. Will consists in giving one such image-of-action our undivided attention, with perhaps an extra flick of consent or signal-giving called a "fiat." In any case, will is the name for a state of mind which stands as the immediate predecessor of an action, and appears to release the causal energies of the "voluntary" muscles.

Now the puzzle of all this, from the purely physiological point of view, is "Why any state of consciousness at all should precede a movement"—and James confesses he does not know the answer. What are the real and determinative antecedents of that physical phenomenon we call a voluntary act? Does our "trying hard" to act, or to think of action, or to think of anything—does this inner exertion of ours which we call "willing" accomplish anything in the world of facts? James thinks that on psychological grounds there is no solution, makes a few vague suggestions about "empirical evidence," admits that he finds it hard to believe that thinking is a wholly useless activity, and lets the matter go over into a higher court.

We all know what James's higher court decided. It de-

2Ibid., p. 571.
cided on pragmatic grounds that the will must be an effective agent in the actual physical changes we call behavior. James rejects those easy solutions of the old puzzle which say that from one point of view an act is free and from another the same act is determined: if you are describing behavior in terms of cause and effect, you find that it is all so describable; if you are evaluating it in terms of its goals, you find that it is all purposed; hence there is no real issue. Kant solved the matter that way: freedom was simply the "intelligible" version of what was on the physical plane necessitated; so Fechner, so Paulsen, so Royce—who contrived the expressions, "the world of description" and "the world of appreciation" to express the difference of the angle of regard. According to these proponents of the "identity theory," if a murderer decides to pull the trigger and his victim falls, all the finger-action on the trigger, since it belongs to the measurable world of cause and effect, had to be from all eternity just what it was: the murderer never had the choice, "to pull or not to pull"; the only element of freedom was in the play of emotive color around the general concepts of law and life that may have taken place in his reflective self during this event. To James this seemed a travesty on the whole meaning of freedom. And here, I confess, I applaud James's flat-footed common sense. Freedom, if it means anything, means the reality of concrete alternatives; and it can only exist in a world in which there is an open issue between "to pull or not to pull," an issue that is not closed until the willing agent closes it.

Where James's answer is unsatisfactory is in the nature of his higher court—the pragmatic method. It was the defect of the pragmatic method that James could acquit himself of trying to give a genuine solution. To point out that we have a vital stake in the matter was important, but to suppose
that the importance could settle the matter was a fallacy. No matter how depressing determinism may be, no matter how important it is that men consider themselves responsible in the concrete for what they do, these concerns do not constitute a settlement—they are nothing more than grounds for hazarding an hypothesis, if we have no time to think it out.

The real relation is reversed by pragmatism. We do not judge determinism false because it is depressing; we are depressed by it because at bottom we know it isn't true! The whole picture it gives of the world and man's place in it is so grotesque, so passivized, so tied-up, so horribly untuning of all the springs of conscious life, so closed-in toward the future, so stingy of possibility, so empty of novelty, so vacuous of all motive for living, that no live man can draw a full breath in its atmosphere without feeling poisoned.

It is not true. But if not, where is the fallacy?

To that neither James nor Royce have given an answer, and an answer is demanded, whether by the scientist or the man in the street. Fortunately, it is science itself which now affords the means for the answer.

2. PSYCHOLOGICAL LAWS VALID ONLY BY CONSENT

The first point to observe is that the scientist who carries his experimental determinism over into the explanation of human behavior is forgetting himself. In his examination of physical things, to forget himself is his duty. But when he is making a psychological observation, he is the observer, and he is also the being observed; this twofold rôle of the observing psychologist cannot be forgotten without distorting the results. And once you recall that the observer is in some respect substantially different from the observed self, the deterministic apple-cart is definitely overturned!
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For it is only the observed self that can be considered a caused self.

Suppose, for example, we were in the position of a character in Ibsen’s “Ghosts,” reflecting on his own heredity, and arguing as follows:

Whatever a man does is the joint product of all the causes, of heredity and environment, that play upon him. I recognize the working in me of ancestral dispositions. My father was a tippler; now as I settle down for an evening with the bottle, I can perceive the growing power of habit upon me; very soon I shall be a drunkard also. I see my future self being caused: there is nothing I can do to prevent it.

One feels a certain insincerity in the reflection. The man who recognizes the causes may be making an accurate observation, but what he is failing to observe is that his very observation is putting him in a position of detachment from the caused self. Either he likes what he sees happening or he does not like it; if he does not like it, he is in a position to change it, just on account of the objectivity involved in the position of observer. (This position is quite different from that of his father, for it has the paternal career in its entirety as one of its data. As Bergson has observed, there are in conscious experience no repetitions, and therefore no precise footholds for laws of recurrence such as all causal formulations are. But our point is a different one. The absence of exact repetition is also true of physical situations and does not invalidate the application of causal formulae, which are always dealing with abstractions from the concrete total event.) Our point is that the emotional bias, inseparable from the function of observing a causal series terminating in oneself, is a factor instantly suspending the continuity of the causal process and subjecting it to a judgment of approval or disapproval. If the observer omits to note his own presence in the total factual situation, he omits, not a detail, but the crucial factor of its denouement.
This situation has already received attention from the logicians, both of ancient and recent times. It is of the essence of the famous paradox of Epimenides the Cretan, who announces that "All Cretans are liars." If his statement is true, he is himself a liar; and then if his statement is in character it is false. If, however, the statement is false, he may be telling the truth, in which case he is a liar. Now this merry bit of self-tripping logomachy is one which Principia Mathematica first attempted to solve by the Theory of Types, which set up a sort of police regulation whereby no proposition is allowed to refer to itself. Under this rule the proposition that all Cretans are liars may refer to all other statements made by Cretans, remaining itself immune from the damaging comment. This solution is unsatisfactory, however, because there are so many propositions which obviously must be allowed to refer to themselves, such as this, that "every proposition either affirms or denies something." The solution must lie in recognizing the intention of the speaker—whether he does or does not intend to include his own statement in the sweep of his statement about statements.

This factor of intention may be illustrated in a concrete illustration which I owe to Professor Wertheimer. Some years ago attendants at the Psychopathic Hospital in Berlin were wakened by a persistent knocking shortly after midnight. A man at the door demanded admission as a patient. "Ich bin verrückt," he said: "I am crazy." Regulations of the hospital required that no one be admitted as a patient except on the certification of two physicians, but as no physicians were available at that hour, and as the prospective patient showed every sign of consent to his own admission, and as it seemed inhumane to turn him away, it was decided in the emergency to accept him for examination. The ex-
amination showed that he was in fact insane, and he was continued for treatment. Relatives of this man, however, complained of the irregular procedure, and brought suit. Their case rested on the circumstance that if the patient had rightly diagnosed his own insanity, he cannot have been insane. If he was right, he was wrong.

The situation is logically perplexing only so long as we fail to distinguish the judging self from the self judged. If we maintain their complete identity, we make any self-criticism logically impossible, for if a man sees something evil in himself, he must be either good or evil in making the judgment. If his self-criticism is true, he is a good judge in judging himself to be evil. If he must be an unjust judge when he judges himself to be unjust, he is effectively estopped from ever admitting his own injustice. But since just self-criticism must be and is possible, the judging self must be able to extricate itself from the condemnation which it issues upon itself. That is to say, the self which is made the target of criticism is in that act of judgment consciously set off from the self which is criticizing. A man may with clear sight perceive his sight to be habitually unclear.

From this point of view, we may say that any man who makes about himself an unfavorable generalization, such as this, "I am lazy," "I am too irritable to get on well with anybody," "I am one of these introverts, and can never brace up to the demands of the hard facts of life," anyone who makes such a statement with intentional disapproval may perfectly well be correct in his judgment with regard to the self he has in mind. If, however, he intends this judgment to apply to his whole self, including the self that judges, he is always lying, because the self which takes that criticized self into an objectified and disapproved regard at that moment, is exercising a justified rejection, free from the
criticized defect, and also holds the balance of power as to the quality of the next action, whether it shall continue the character of the self which is judging or the character of the self which is judged.

For the same reason, any psychological generalization about any person, which is an unwelcome generalization, becomes false just as soon as that person becomes aware of it. If some observer judges that I am "lazy and good for nothing," he may be quite right; but if he communicates that judgment to me, and I do not like it, he immediately becomes wrong, if only for that moment. It is the precise function of many such generalizations to make themselves false. When we become impatient with our neighbors and "tell them what we think of them," we often do so with the secret hope that these neighbors will stir themselves to prove that we have slandered them. Admonitions of parents to children are frequently charged with this benevolent prevarication. "You slovenly little rascal; your room is a horror"—is a type of language whose intention is to provoke the moment of repudiating self-consciousness. I should not like to insist that all education of character requires to be carried on by falsehood; but I do point out that to associate one's own re-buke with the child's self-rebuke (or vice versa), making conscious use of the non-identity between the condemned self and the self-which-condemns—that technique is essential in all ethical growth.

In brief, the distinction between a physical science and a mental science is this: the laws which hold good of physical nature remain valid whether I like them or not; the laws which can be formulated about mental nature remain valid only if I consent to them.

This is rather hard on the formulations of psychology and sociology, for these sciences are most successful just at the
points at which our conduct is most objectionable. They can most enlighten us by explaining our errors and irrationalities. This is, in fact, outside of elementary psycho-physics, the only region of our conduct that is capable of causal explanation. It is wholly impossible for any natural science to explain why in performing mathematical calculation you get the right answer. If you get the wrong answer, there must be a cause—fatigue, eye-strain, interruption, forgetfulness, psychical blindness, an anti-mathematical complex under which some people needlessly suffer, specific number-phobias—any one or more of a hundred intruding incidents may throw you from the right track. Only, the right track itself has no causes, because it is no function of any space-time variable: no alteration of temperature, latitude, barometric pressure, or of your own state of health affects or has any relevance to the validity of the famous formula two and two are four. The multiplication table is not a psychological phenomenon; our difficulties with it are. It is for this reason that popular treatises on psychology are filled with the record of human foibles, irrationalities, even vices: these are the things capable of explanation. The impression is strongly conveyed that man is after all a creature of irrational impulses and his endocrine secretions. What is not insisted on is the more important feature of human nature: not one of those irrationalities remains valid, once it is discovered, a moment longer than we wish it to.

For example, it is a generalization some psychologists risk that the average of men are governed more by emotional suggestion than by reason. From this law it would follow that if you wish to defeat an uncompromising opponent at the polls it is not necessary to show the error of his argument: it would be more judicious not to argue but to rouse prejudice against him. It is on this plan that the
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A publicity representative of a certain power company was said to have operated when, on being asked what he would do to defeat a state senator who wanted a publicly-owned power plant, he answered "Pin the Bolshevik label on him." One can very well believe that this use of the law of the irrationality of the Demos would be successful, but only up to a particular moment, the moment when the public concerned learns what is being done to them to deflect their votes: then one can imagine the speed with which the law ceases to work!

This phrase that I have just used is not quite accurate: no law ever "ceases to work," it merely ceases to apply. If I have a prejudice, I act on that prejudice, and anyone who plays on that prejudice will get my prejudiced reaction, which may be what he wants. But if my attention is called to the fact that I am operating on an unexamined prejudice, I do something like stopping payment on a check: I suspend the prejudice, pending examination, and the man who then appeals to it finds that it is not doing business as usual. This power of suspending the factual mental conditions on which causal laws take hold is what we mean by freedom. And because of this power, those pseudo-laws which pretend to say what human beings will do under various circumstances are always being invalidated by the unlimited resources of human nature. It is a prediction from such a pseudo-law that "Bombing civilian populations will lead them to sue for peace"; it has been tried, first on Spain, then on China, then on England, and each time the resources of human nature suspended the reflex outflow of its own pain and terror. Freedom means no cancellation of genuine causal laws—such as that mental vigor cannot continue without food and drink and a sufficiency of iodine—and no denial of "tendencies," but it means that no such law operates alone within
the organism: it operates as a factor within a purpose. And no condition to which such a law could apply will remain, unless it has the continued consent of that purpose. This means that the total law of human behavior is not causal, though it contains a whole cable of causal strands, which remain there by consent. While it is possible to predict partial elements of behavior, especially when the subject being predicted about is unaware of the prediction, it is never possible to predict the conduct of a human being in its total shape.

And finally this means that the determinists are concretely wrong; and that men may reasonably be called upon to rouse themselves to deeds which, apart from their free decisions, will simply not happen in the universe.¹

3. THE VALUE OF MAN

Now, if man is free in the sense we have defined, this freedom has everything to do with his value. At the moment of his free act, he is Archimedes: with his lever he moves the world. It is this capacity which makes the essential difference between the man, the animal, and the thing.

In his own eyes the value of man is closely connected with his freedom. I believe that Sir Charles Sherrington’s phrase is a good one—it bears on his zest-for-life. But more than that, it bears on his self-respect and on his respect for the rest of his kind.

So with our attitude to others: we cannot fully respect those whom we do not regard as free. We have no obligation to share with them our emotional life. When a bar of hot

¹The question, How freedom is possible, is one which opens at this point, and which requires from the scientific point of view an answer. The mathematics arising from the theory of relativity have, I believe, provided the necessary tools for this answer. I may here say simply that I find the considerations of Minkowski’s Memoir of 1908 the most pertinent to our problem.
iron is drawn through a die to make wire, we are not con-
cerned with the sentiments of the iron. When we propose
to make use of a causal law in affecting the behavior of our
fellow men, we assume the same position of separation from
his emotions: of course, he has emotions and purposes where
the iron has not, but we utilize them for our needs: it is the
art of the exploiter to play on these emotions without being
moved himself. He is in the literal position of the unmoved
mover of Aristotle, but with a private axe to grind. Now the
law of loyalty between man and man is that no one has a
right to move others except by way of his own emotion.
Honest persuasion seeks to come to agreement on values,
that is, to induce in others the feeling which one entertains
toward the ends of action: it respects the freedom of the
other person, to be moved to action solely by his own esti-
mate of worth. In this relation there is no opportunity for
the unavowed use of causal laws.

Freedom, then, is a necessary condition of the value of
man either in his own eyes or in that of his fellow man; and
to treat men as if they had free wills is the first meaning of
the term equality. Those who use psychological arts on
others are implicitly treating them as inferiors.

Freedom, then, is a necessary condition of human worth.
It is not, however, a sufficient condition. The worth of life
has also something to do with the contents and objects of
existence. What can we say on this point?

There are two laws of worth, or of meaning, which con-
 verge and cross in the human being: one, that value is an
 aggregate which is composed of valuable items, or of a bal-
 ance of positive over negative items: the value of the whole
comes from the values of the parts; the other, that value is
a totality which descends from the whole to the parts: if the
whole is worthless, the parts cannot retain their charm.
These rules appear inconsistent; and would be so if either claimed to be exclusive. In point of psychological effect, both do play a part in human self-estimation.

Unquestionably items of pleasure are important in conferring a positive value on the day’s experiences. A spot of pleasure is not, as sometimes is said, a momentary affair: its destiny is to spread beyond its borders, and to raise the value-level of existence both by prospect and by retrospect. Likewise a spot of pain will depress a region of existence around itself—like the discomfort of an impending surgical operation; and a day’s length of unrelieved pain would be able, if intense enough, to obliterate the whole worth of that stretch of existence. Pain may be said to hold a veto power over the value of living; though it is possible with long practice to encyst it and flow around it.

But, equally unquestionably, items of pleasure and pain do not make or mar the value of a life, for over every item of human consciousness there hangs the awareness of the whole as a frame for the part, and what the whole is passes a constant stream of comment on the part. We may equally say that the whole possesses a veto power over the quality of the part. That is the specifically human mode of consciousness: the animal does not worry about the whole of things, man is haunted by the question, What is the nature of the whole into which my doings fit?

An animal does not foresee its death (though the approach of death seems to arouse in some species a particular reaction of withdrawal); man plans his actions with reference to a probable time-limit, and establishes insurance on the basis of his “expectation.”

Psychologically, it is easier for any man to say what the day’s work has been worth to him than to say what his life is worth. We know the purposes of a day or a year better
than we know the purposes of a life. What do you aim at professionally? This question has a possible answer. What do you aim at for your life as a whole? This question will bother all but a few persistent speculators. How then do we come to guess the meaning of the whole?

To some extent, every man takes his cue from the drift of his crowd; what they consider worth doing we accept as worth doing. What do you call a good time? There is a general conception of a good time in the social air; you give a party based on that idea; you invite me to the party, and if I say this is not my idea of a good time you are not pleased with my originality and independence. You say to yourself, "a disagreeable and opinionated wretch." If one's feelings fail to flow in the moulds provided by the social ritual, the introspective exception may wonder whether something is wrong with him. If this almost passive valuing-with-the-crowd were the whole story, we should say that men impose on one another the attitudes toward war, hardship, death, which render these sufferers not intolerable companions: they insist on a certain stoical endurance, a reticence about grief, a willingness to retire from the active scene, and to transfer the burdens to others, which eases the desolating facts of finitude. Whatever a man may feel about his own extinction, he must not make life harder for his neighbors by transferring it to them: bear your burdens in solitude.

But here the individual man ceases to be either an animal or a merely social animal. He insists on thinking beyond mere thoughtlessness. Where numbness is comfort for a bad prospect, like the coma preceding death, he declines the comfort. He wants to know what is in store for him. This is his religion. It is his recognition that as a rational animal he cannot retain a sense of worth in his doings if the whole in which he is inserted has no significance. He does not need to
know what the significance is; he does need to know that it is there!

And it is here that society also ceases to be merely social, for it recognizes that the individual is right in making his own worth depend on the worth of the whole. It provides this support to his morale; it sustains the institution of religion as a public obligation.

It is often assumed that this is an indirect mode of lending sanction to its own requirements, as Walter Bagehot suggests, of establishing the "cake of custom." Religion thus becomes a temporary expedient for creating social stability. Freud has recently so exhibited its function. But these views omit one phase of the matter which is crucial. The most primitive religions address themselves to the solitary individual and his needs; and if the individual is only half awakened, only half extricated from the social context, these religions make it their first task to arouse him to separateness. The ceremony of initiation requires solitude, fear, and pain, and the establishing of a wholly individual relation to the other world. It is this sharpened individual self-consciousness which is then entrusted with the sacred lore of the tribe. Perhaps the societies which have not thus provided for the answer of the individual to his individual questions to destiny have perished; at any rate this is true, that society so far as we can trace it gets its support only as a consequence of first reassuring the individual of the worth of his individual life apart from society. It is as if society had acted on an instinct to the effect that it had to confer worth on the individual, even at the cost of destroying his absolute dependence on society, in order to retain an indispensable morale in regard to his own life.

If so, this is an early instinct which a late sophistication has attempted to overcome, for it is just the definition of
the totalitarian state that the individual can have no worth in independence of the state. And it is the nemesis of the totalitarian state that if this is the case the individual’s own instinct truly advises him, though by way of premonition, that he has no worth at all.

But how can any valuation be placed on the world as a whole? If the worth of a whole life is more elusive to consciousness than the worth of segments of a life, how much more elusive is any worth of the whole process. Is it not more near the judgment of common sense to say that the whole is and ought to be a **background** of worth, not an object of worth in itself? The stage-setting may have its own aesthetic interest, but it ought not to interfere with the meanings of the play. The world is the stage-setting of life, not an independent object of value, apart from its own aesthetic grandeur and sublimity.

In allowing religion to enter as an affirmer of value in the whole scene, an affirmation usually contained in the conception of God, have we not admitted that there is no scientific support for the notion, perhaps not even a semantic support for the use of the term “meaning” in that relationship?

I reply in the negative. Though science cannot affirm the worth of the world, nor even define what might be meant by that expression, neither can it deny that worth. And, as in the case of freedom, it must remain open to the discussion of the problem, how is that worth possible?

4. **THE WORTH OF THE UNIVERSE**

On this point let me bring forward just a single and very simple consideration. It has to do with the distinction between the laws of Nature and the configurations of the entities in Nature. These two elements are involved in every
physical discussion, and they are independent of one another. It is evident that, however much we know of the laws of motion, these laws alone give us no knowledge of where any body will be at any time. In order to predict its future position we must have given the facts of its present position, its present velocity, and its relations to other bodies, in brief, a total pattern of these facts to which the laws are supposed to apply. The formulae of these laws must contain algebraic coefficients whose numerical values must be inserted in place before the formulae can give a numerical answer. Or, to put it in more logical language, the laws are generalities; the factual data regarding the position and so on of the particles are particulars. It requires the union of generals and particulars to constitute a real world. The attention of scientists is naturally drafted off to the observation of general laws. But some branches have likewise been devoted to the compilation of factual data, such as the Nautical Almanac, devoted exclusively to configurations of the stars.

The point of this distinction is that the configuration of the world is a variable independent of its laws, that is to say, that for any given set of laws, an infinite number of assumptions may be made about the configurations to which it applies. And furthermore, if we begin with a given set of laws and a given configuration, we may possibly derive from those data all the future configurations of the assumed universe, so that the given and subsequent configurations may be taken as a single block of history, after the mode of the world-line of Minkowski. But in taking any such total history we are unable to make the assumption that it will include all the possible configurations through which those particles could run. We can, in fact, demonstrate that in general it will not run through all possible configurations, by an infinitely large factor.
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For example, our original configuration will be either symmetrical or unsymmetrical. If symmetrical, and if the laws in question, such as gravitation, elasticity, are such as apply to all bodies without discrimination alike, then all the subsequent configurations will be symmetrical. If it is at first unsymmetrical, all subsequent ones will be unsymmetrical. None of the configurations of the first infinite series will coincide with any of the configurations of the second infinite series. Hence it is not only possible but scientifically necessary to consider any state of the world as a configuration which “had to be” only in the sense that it follows from previous configurations, not at all in the sense that any configuration at all had to be. The history-as-a-whole did not have to be. Whether there is any inherent necessity in the laws themselves—a matter which has not been demonstrated—there is no necessity either in the amount or the distribution of the entities composing Nature. They cannot be deduced from the laws.

If then we may take it as established that no configuration is from the physical point of view necessary, no series is necessary. The idea of emergent evolution has been used as if there were an inherent “nisus” toward increasing complexity of form in Nature, so that the arrival at organic forms and at the human organism was, so to speak, on the cards of any material universe. This assumption has no mathematical basis whatever. The fundamental idea of emergent evolution is that a certain complication of arrangement will at various stages carry with it new and unpredictable qualities. But if no configuration is necessary, then no complication is necessary. In spite of Spencer’s pseudo-principle of the “instability of the homogeneous,” there is no necessity for any increase of complication in the world except by virtue of an earlier configuration which need not have existed.
I defy anyone to show that any original configuration of the world need have been either symmetrical or unsymmetrical. It has been natural to assume that, if the world had a beginning in time, it would have started as a spherical nebula, or some other symmetrical or homogeneous shape: if any aesthetic motive had presided at such an hypothetical first stage, that might have been the case. But in point of fact, if we are to appeal to probabilities in their complete disinterestedness regarding aesthetics, the symmetrical arrangement would be the most improbable of all. And if we were to begin with it, we could never escape from the clutches of its dreadful internal harmony. The only developing universe would have to be an irregular one; and of all the infinite number of irregular universes, only a vanishing fraction would have any such thing as a "developing" history, that is to say, one in which any feature such as you or I might be interested in would proceed in ascending stages, like the orthogenesis of the vertebrate eye, or of the horse’s hoof.

Many of the irregular universes we might imagine would have the mathematical character of the recurring decimal, a certain number of places and then repeat. If this fate, which was accepted by the Stoics, and by Nietzsche, were to be escaped, it would be by a careful choice of the irregularity to be at first lighted on!

The upshot of this line of thought is simply this: that if anything we consider important were to come out of a universe operating according to natural laws, that something would have had to be impressed specifically on the historical configuration. This proves nothing to the effect that the configuration of the world has been chosen, because it has debouched in us. It leaves open to anyone to believe if he can that our appearance in the universe is an accident, because
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configuration itself is an accident. He may be supported in his views by the circumstance that so far as we know, there are no other corners of the vast universe where such an arrival has occurred. And even if there were, it could still be an accident in the sense of an event devoid of either mechanical necessity or of purpose.

But the more the probability of the arrival of such a being diminishes in the scale of chance, the more forced does such an attitude appear outside the realm of pure science itself. The implications of configuration—let me put it thus—are what give the empirical foothold for the idea of purpose on the whole of things. This idea will be confirmed if we have any other grounds to affirm it. Meantime it will be for the scientist to recognize the existence of a blank, which may or may not be filled, without derogation to his own work. This argument I regard as a generalization, and to some extent a correction, of that put forward by my late colleague Professor Laurence J. Henderson.

And I have recently come upon an unsuspected confirmation. In a visit to the California Institute of Technology, in January of this year, I found the astronomer, Professor Fritz Zwicky, discoverer of many of the known supernovae, expressing his belief in a principle which he called the “postulate of the inexhaustibility of the aspects of Nature.” He felt that this postulate has a high degree of certitude; and that on it is based our human confidence in the continued possibility of discovery, and of important discovery, since, however much has been learned, there remains an unlimited reservoir of fundamental truth still to be learned, and open to those who start off on new lines quite as well as to those who continue the lines already established.

The human implications of this principle are obviously tremendous. But I content myself with observing that it is a
principle of configuration, and as such one which need not be true; for no one can demonstrate that the world must have an inexhaustible wealth of aspects. If the principle is valid, as I suspect it is, it is another item in the invitation to consider the universe from the standpoint of its purpose or meaning, and thus to support the groping of the human creature, in many ways so humbled by the advance of our knowledge of the extent of the universe—his groping for an exterior corroboration of his self-respect.

Thus the two values are intertwined, that of the world and that of the human creature in it.

And we are not left to mere conjecture, nor the will to believe, to fill the blank space left by the scientific permission to believe in worth. For value is printed in at least one character of the world, which is everywhere. It is in that character of space and time which has so long puzzled both scientists and philosophers. Of them we can say with assurance that they do not appear to us as private or subjective characters but as public characters. We can by an effort of thought realize that they might be considered as “in us” without changing their momentary quality. But belief at once restores to them the character of being common, that is, of being shared with others. The very spontaneity of this unprovable acceptance of this space as our space, and of this world as our world (which again is among the things never explained or explainable to children and therefore must be there from the first) is the mark of an aboriginal impression of companionship in the experience of Nature—prior to human companionship, outlasting it, and outriding its vicissitudes.

It is because of this pervasive other life within Nature that we feel an “ought” in dealing with it. And because of that, science as an object of our united labors stands as a
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body of truth which we ought to build and which shall abide when all its workers shall have passed on.

We may call this recognition of a Life and therefore a Meaning within Nature a religious recognition if we will—I regard it as empirical fact as well. In that case Science and Religion have at least one point of contact in affirming a value in the universe which in turn will confer meaning on the lives of free men. And from that point on, Religion may add yet other values without incurring scientific rebuke, because the principle of value will have been established, by Religion and Science together.

THE END